

# A new subspecies of Gurney's Hawk *Buteo poecilochrous*

by J. Cabot & T. de Vries

Received 28 July 2008; final revision accepted 27 June 2009

**SUMMARY.**—A new subspecies of Gurney's Hawk *Buteo poecilochrous* is recognised for populations of the species from northern Peru and western Bolivia to north-west Argentina and northern Chile. Specimen analysis reveals that they differ in size and plumage from northernmost populations, in south Colombia to south Ecuador. The new subspecies is slightly smaller in body measurements and in definitive plumage has the grey-feathered areas darker and more slate-coloured than the nominate subspecies. Furthermore, pale- and dark-morph females possess a more extensive dorsal patch; the pale morph has white central underparts and finely barred or vermiculated sides, whilst in juveniles, in general, these areas are warm brown with rusty or cinnamon markings. In the nominate form, by contrast, the underparts are usually darker brown with creamy or whitish markings.

*Buteo poecilochrous* is a high-Andean hawk found from southern Colombia to northern Argentina and Chile (Fjeldså & Krabbe 1990). Gurney (1879) mentioned Yauayacu, in Ecuador, as the type locality. This name cannot be located on any map, but Cabot & de Vries (2005) considered it to be a transcription error of the Quecha name 'Yanayacu', which is a village in Ecuador (01°25'S, 78°39 W). Further evidence to support this proposition can be found in Sclater & Salvin (1880), wherein it is stated that Clarence Buckley, who collected the type specimen, took the greater part of his 10,000 Ecuadorian specimens along 'the upper branches of the Rio Pastaza, and on the spurs lying between this stream and its affluent the Bobonaza, Mr Buckley's headquarters having been during the greater part of the time the village Sarayacu on the latter stream, which must be carefully distinguished from the place of the same name on the Ucayali.'

Here, we firstly justify the recognition of *B. poecilochrous* as a species separate from Variable Hawk *B. polyosoma*, and then proceed to describe a new subspecies of Gurney's Hawk from the *puna* and high Andes above 3,000 m, from northern Peru (Marañón Valley and the Porculla pass) south to north-west Argentina and northern Chile. The nominate subspecies is restricted to the *páramos* of southern Colombia to southern Ecuador. The recognition of the new subspecies is based on Mayr (1963) who defined a subspecies as 'an aggregate of local populations of a species inhabiting a geographic subdivision of the range of the species, and differing taxonomically from other populations of the species'. The vernacular name Gurney's Hawk *Buteo poecilochrous* is employed in this paper following Jiménez & Jaksić (1990) and Jaksić *et al.* (1991), as well as our own proposal (Cabot & de Vries in press).

## Taxonomic status of *B. poecilochrous*

We take this opportunity to reiterate that *B. poecilochrous* and *B. polyosoma* are distinct species in accordance with the Biological Species Concept, as proposed by Cabot & de Vries (2003) but contrary to Farquhar (1998). Furthermore, we clarify the following points. The two species are of different size with different biometrics. There is evident sexual dimorphism but the wing lengths of the two species do not overlap in either sex, although that of some female *B. polyosoma* may overlap those of male *B. poecilochrous* (Cabot & de Vries 2003;

Fig. 4). The clinal gradient in body size related to altitude proposed by Farquhar (1998) does not exist. Each taxon is morphologically different (Cabot 1991, Cabot & de Vries 2003). No intermediates have been detected. Farquhar (1998) observed that geographical size differences vary from one species to the other. In *B. poecilochrous* the northern form is larger than the southern taxon, contrary to Bergmann's Rule (this study), whereas in *B. polyosoma* the largest forms occur in southern South America and on islands such as the Juan Fernández (de Vries 1973, Jiménez 1995, Cabot & de Vries 2003). Some individuals of *B. polyosoma* in the lowlands of south-west Ecuador and extreme north-west Peru ('*peruviensis*') are smaller than the intermediate Andean form found at the same latitude but which is apparently separated by altitude with no known overlap (Buitrón-Jurado *et al.* in press).

The two species are separable by plumage characters. There are two colour morphs in *B. polyosoma*, and age-related changes in plumage occur in both *B. polyosoma* and *B. poecilochrous* (Cabot & de Vries 2004, 2005). In *B. poecilochrous*, adult females, immatures and some males of both colour morphs possess heavy dark barring on the tertials, secondaries and all wing-coverts, not unlike those in Black-chested Buzzard-Eagle *Geranoaetus melanoleucus*. In *B. polyosoma* obvious and extensive barring on the upperparts is usually absent (Fig. 1), being faint, pale and more restricted to the secondaries. In both species, age- and sex-related plumage types resemble one another more in pale morphs (Fig. 2) than in dark morphs (Fig. 3), although diagnostic differences are still evident (Cabot & de Vries 2004).

The two species occupy different habitats where they occur in sympatry. *B. poecilochrous* occurs in grassy páramos, puna steppe and on montane ridges, usually >3,000 m, whereas *B. polyosoma* inhabits more xeric, scrubby and forested habitats, usually between sea level and 3,000 m, although it is occasionally found above 4,000 m (Cabot 1991). Recently, in the Atacama Desert of Chile, a population of *B. poecilochrous* was discovered in the river gorges that dissect the pre-Cordilleran plains, in which region *B. polyosoma* occurs in more brushy areas with scattered trees or open forests, as well as in neighbouring desert scrub beyond fluvial environments (Cabot *et al.* submitted).

Lerner *et al.* (2008) treated *B. polyosoma* and *B. poecilochrous* as species derived independently from White-tailed Hawk *B. albicaudatus*. The lack of genetic divergence between the two species does not automatically indicate conspecificity, as has been clearly shown for Galápagos *B. galapagoensis* and Swainson's Hawks *B. swainsoni* (Hull *et al.* 2008).

Finally, we emphasise that the dark morph of *B. polyosoma* has marked sexual dimorphism: females are all grey or blackish grey with a broad uniform reddish breast-band, whereas males have uniform grey underparts (Fig. 1) (Cabot & de Vries 2003, 2004). In *B. poecilochrous* the underparts of both sexes are similar in both morphs: in the pale morph, both sexes are white below (Figs. 6–7), whereas in the dark morph they are grey and white (Figs. 4–5). In the latter morph the sexes often show the same patterns of marks and bars.

## Methods

We examined 73 specimens of *B. poecilochrous* held at the following institutions: Museo de la Universidad del Cauca (Popayán); Instituto de Ciencias Naturales, Universidad Nacional de Colombia (Bogotá; ICN); Museo Ecuatoriano de Ciencias Naturales (Quito); Museo de Ciencias Naturales del Instituto 'Mejía' (Quito); Museo de la Escuela Politécnica Nacional (Quito; MCNQ); Museo Nacional de Ciencias del Instituto Técnico Superior 'Bolívar' (Ambato); Universidad Nacional (Quito); The Natural History Museum (Tring; BMNH); Institut Royal des Sciences Naturelles de Belgique (Brussels; IRSNB); Muséum National d'Histoire Naturelle (Paris; MNHN); Estación Biológica de Doñana (Seville; EBD);



Figure 1. Upper images adult male (BMNH) and female (NHRM) Variable Hawks *Buteo polyosoma* in dark-morph plumage, ventral and dorsal views; below, adult and female pale-morph *B. polyosoma* held at ZMA and NHRM, respectively (J. Cabot)





Figure 2. Upper images, pale-morph female Gurney's Hawks *Buteo poecilochrous* in, left to right, their first-, second- and third-calendar years (specimens held at ZMB, NHRM and MCNQ respectively); below, one first-calendar year male (BMNH) and two, second- (BMNH) and third-calendar year (MHNG), pale-morph female Variable Hawks *B. polyosoma*. All specimens of both species are from the Ecuadorian Andes, except one from the Colombian Andes (J. Cabot)





Figure 3. Upper images, dark-morph first-year Gurney's Hawks *B. poecilochrous*, all from Ecuador (from left to right held at ZMUC, NHRM and ZMB); below, dark-morph first-year Variable Hawks *B. polysoma*, from several countries; the left-hand specimen held at IRSNB, the others at NHRM (J. Cabot)

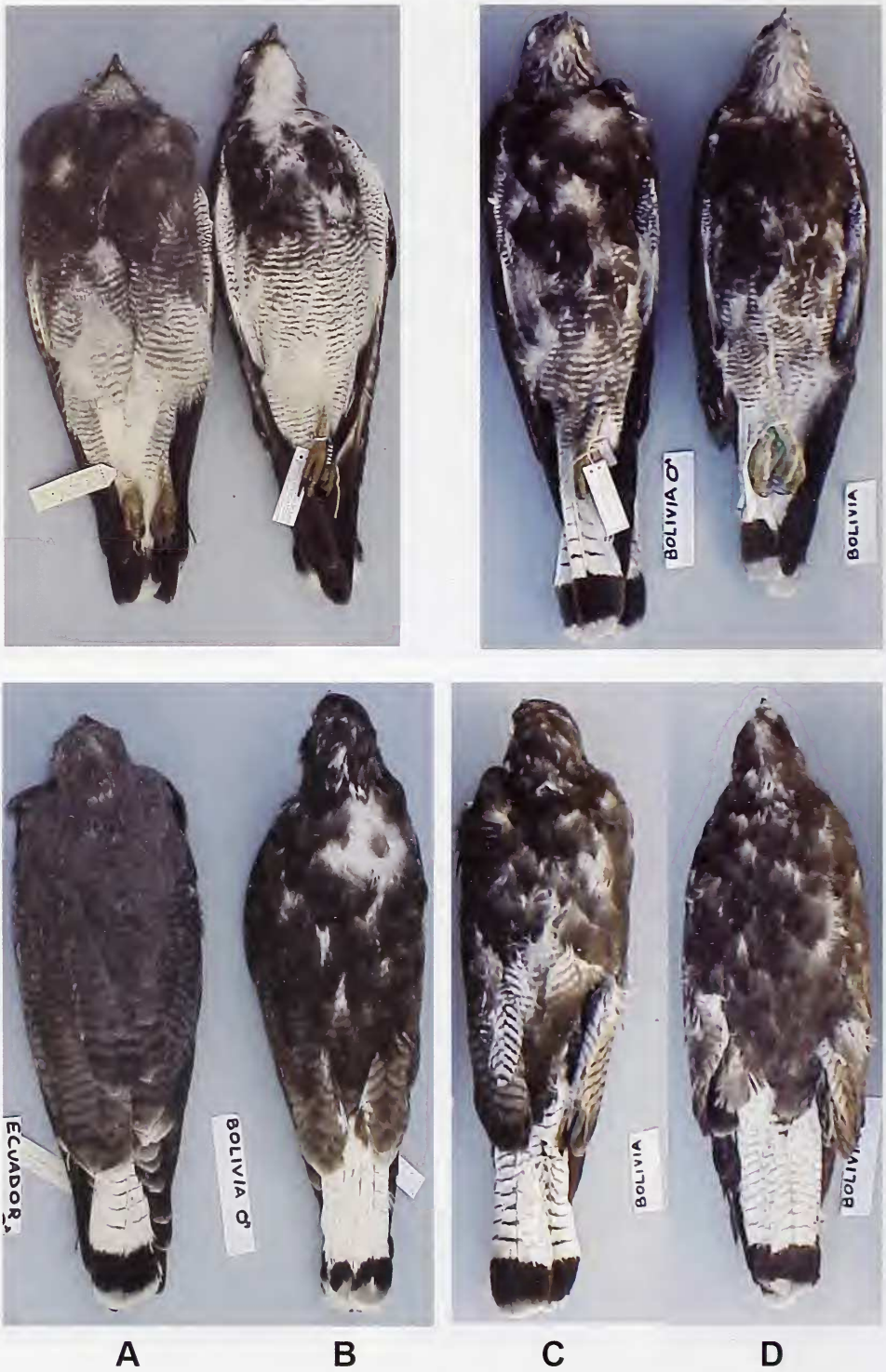


Figure 4. Dark-morph adult male Gurney's Hawks *Buteo poecilochrous*: (a) nominate subspecies from Ecuador (NHRM); (b-d) subspecies *feldsai* from Bolivia (EBD), holotype and two paratypes, respectively (J. Cabot)





A

B

C

Figure 5. Dark-morph adult female Gurney's Hawks *Buteo poecilochrous*: (a) nominate subspecies from Ecuador (ZMB); (b and c) subspecies *fjeldsai* from Bolivia (EBD) and Chile (BMNH), respectively. Specimen (c) has a reddish tinge to the central underparts that is typical of pre-definitive plumage (J. Cabot / (c) © The Natural History Museum, Tring)





Figure 6. Pale-morph adult male Gurney's Hawks *Buteo poecilochrous*: (a and b) nominate subspecies from Ecuador (Museo de Ciencias Naturales del Instituto 'Mejía', Quito); (c and d) subspecies *fjeldsai* from Bolivia (EBD) and southern Peru (NMNH) (J. Cabot)



Figure 7. Pale-morph adult female Gurney's Hawks *Buteo poecilochrous*: (a and b) nominate subspecies from Ecuador; (c and d) subspecies *fieldsai* from Bolivia and Chile (BMNH) (J. Cabot / (c and d) © The Natural History Museum, Tring)

Museo Nacional de Ciencias Naturales (Madrid); Naturhistoriska Riksmuseet (Stockholm; NHRM); Zoological Museum (Copenhagen; ZMUC); and Naturalis (Leiden; RMNH). To complement this, we also examined photographs of specimens from the Museo Nacional de Historia Natural (La Paz), the National Museum of Natural History (Washington DC; NMNH) and Museum für Naturkunde (Berlin; ZMB). During 1996–2002, we monitored annual plumage changes of five Peruvian *B. poecilochrous* that had been held in private zoos and hawking centres since they were juveniles. Field data were collected on an irregular basis in Peru and Bolivia between 1981 and 2004 and in Ecuador from 1986 to 2008. Unsexed specimens were sexed by measurement (Cabot & de Vries 2003) and molecular techniques (Ellegren 1996). Photographs of *B. polyosoma* were also taken of specimens housed at the Zoological Museum, University of Amsterdam (ZMA), Museum d'Histoire Naturelle Ville de Geneve (Geneva; MHNG) and at several of the museums mentioned above.

Because the species possesses two colour morphs and delayed plumage maturation, specimens in definitive plumage were selected as the holotype and paratypes for the new subspecies. Plumage patterns vary with age and sex for up to six years before definitive plumage is attained (Cabot & de Vries 2008), as is also true of Variable Hawk *B. polyosoma* (Pávez 1998, Cabot & de Vries 2004). The holotype of the new subspecies, a dark-phase male, coincides in sex and morph with the holotype of the nominate subspecies (Gurney 1879), whilst the paratypes comprise pale-morph and dark-morph birds of both sexes.

For the morphometric analysis, body measurements were taken from 36 females (two from Colombia, 12 from Ecuador, seven from Peru, 12 from Bolivia, one from Argentina and two from Chile) and 37 males (19 from Ecuador, five from Peru, 11 from Bolivia and two from Chile). The following measurements were taken: culmen from tip to skull; cranial width (post-orbital border); length of the cubito-radius; tarsus; middle and hind toes; outer and hind claws (using callipers, to the nearest 0.01 mm); width of the second (p9) and third (p8) outermost primaries at the base of the notch; wing, alula and tail lengths; the outermost primary (p10) and the outermost secondary were measured at their maximum length from the tip to the skin insertion (flattened against a ruler, to the nearest 0.5 mm).

An analysis of variance was used to evaluate the significance of any differences in the morphometric variables.

### *Buteo poecilochrous fjeldsai* subsp. nov.

**Holotype.**—Adult male, EBD 7274A, collected 8 June 1984 by J. Cabot at Peñas, prov. Los Andes, dpto. La Paz, Bolivia (16°14'S, 68°30'W; 3,850 m). Habitat: *puna* with grass tussocks and *Lepidophyllum* scrub. Weight 810 g; total length 540 mm; culmen 34 mm; tarsus 89.3 mm; wing 434 mm; tail 221 mm; testes: left 12 × 6 mm, right 10 × 6 mm.

**Paratypes.**—*Dark-morph males*: EBD 4866A, arroyo Cañuma, prov. Bautista Saavedra, dpto. La Paz, Bolivia, 19 July 1982; high-Andean *puna*, west of the east Andean cordillera, 4,600 m. EBD 6917A, 30 km south of La Paz city, prov. Murillo, dpto. La Paz, Bolivia (16°46'S, 68°10'W), 7 January 1984; *puna* with rolling plains of sparse tussock grass, 3,800 m. EBD 7476A, Sopocachi, prov. Pacajes, dpto. La Paz, Bolivia (15°05'S, 69°06'W), 10 November 1984; semi-arid *puna* with rolling plains and hills of *Lepidophyllum* scrub, and rocky areas with cliffs and small stands of *Polylepis*, 3,700 m (all collected by J. Cabot). MNHN 3024, Checayani, 37 km north of Lake Titicaca, dpto. Puno, Peru (14°48'S, 70°01'W), collected 10 December 1960 by J. Dorst. BMNH 1899.10.3.3, Peru, c.4,900–5,500 m, collected by G. P. Ashmore. BMNH 1902.3.13.1601, Choquecamate, dpto. Cochabamba, Bolivia (16°50'S, 65°70'W: given by collector), collected 29 July 1901 by P. O. Simons; 4,000 m.



*Dark-morph females*: EBD 6925, 40 km north-east of La Paz, near turn-off to Pucarani, prov. Murillo, dpto. La Paz, Bolivia (16°22'S, 68°30'W), collected 14 January 1984 by J. Cabot; *puna* with rolling plains of sparse tussock grass, 3,800 m; ovaries 21 × 12 mm; weight 1.2 kg; stomach contents a bird (*Turdus chiguanco*?) and beetles. MNHNP 3025, Azángaro, dpto. Puno, Peru (18°47'S, 68°15'W), collected 10 December 1960 by J. Dorst. BMNH 1892.2.10.438, Lalcalhuay, prov. Tarapacá, Chile, collected 27 January 1886 by C. Rahmer (cf. Paynter 1988). BMNH 1904.7.9.3, either Rinconada, near Laguna de Pozuelos, or elsewhere in the dpto. of Rinconada, prov. Jujuy, Argentina (22°26'S, 66°09'W), collected 4 June 1897 by G. F. Gerling; *puna*, 3,870 m.

*Pale-morph males*: EBD 5700A, 10 km north of Sevaruyo, prov. Avaroa, dpto. Oruro, Bolivia (19°16'S, 66°50'W), 6 November 1982; arid *puna* with thola scrub, 3,700 m. EBD 6917A, Huachacalla, prov. Litoral, dpto. Oruro, Bolivia (18°47'S, 68°15'W), 12 August 1984; *puna* desert with sparse grass tussocks and thola scrub, 3,700 m (both collected by J. Cabot). BMNH 1902.3.13.1598, Choquecamate dpto. Cochabamba, Bolivia (16°50'S, 65°70'W: given by collector), collected 30 July 1901 by P. O. Simons; 4,000 m (wrongly sexed as female).

*Pale-morph females*: BMNH 1873.7.4.5, Ccachupata (= Cachupata: Stephens & Traylor 1983), dpto. Cuzco, Peru (13°39'W, 71°52'W), collected 14 November 1871 by H. Whitely. BMNH 1899.10.3.2, Alto Perú (= Bolivia), collected by C. P. Ashmore; 3,000–5,400 m. BMNH 1887.5.1.333, Macaya, Iquique, Chile (20°07'S, 69°11'S), collected by H. Rowland (cf. Paynter 1988).

**Diagnosis.**—*Buteo poecilochrous fjeldsai* differs from nominate *B. poecilochrous* as follows. (1) Darker overall, from steel grey to slate-grey, unlike nominate, whose plumage varies from pale grey to mid grey. (2) Upperparts more uniform and blackish barring less obvious. Barring covers basal half of primaries, secondaries and, sometimes, median and greater wing-coverts, whereas in *B. p. poecilochrous* the barring covers only the lesser and median wing-coverts. (3) Inner secondaries and primaries have grey borders to their tips, whereas in *B. p. poecilochrous* the secondaries are broadly fringed white and the inner primaries have white tips. The white fringes are especially wide on the northernmost bird we examined (Túquerres, Colombia: ICN 8724). (4) Barring on uppertail- and undertail-coverts fainter and finer than in *B. p. poecilochrous*, as are the transverse tail bars above the black subterminal band. Females of the new subspecies possess a larger dorsal patch, extending from the mantle to the middle scapulars, with some red on the lower scapulars, whereas in *B. p. poecilochrous* it is restricted to the mantle and upper scapulars (Figs. 1–3); individual variation does exist, however. Plumage changes with age, and females in their third to fifth calendar-years may be very reddish, with an extensive dorsal patch, and reddish feathers elsewhere (rump, back, wing-coverts, flanks, and middle and lower underparts in dark morphs) that they will lose by their sixth year (Cabot & de Vries 2008).

Dark morphs of both subspecies have barred underparts with similar patterns. *B. p. fjeldsai* has a white throat with blackish streaks, foreneck and breast steel grey to slate-grey, the feathers broadly white-edged and intermixed with pure white feathers. The rest of the underparts are strongly barred steel grey to slate-grey and white, except the undertail-coverts, which are white with slight dark vermiculations. *B. p. poecilochrous* has mid grey and whitish-grey bars, the pale throat patch is smaller and it has fewer pale marks in the bib. Some *B. p. poecilochrous* have a uniform grey throat to chest, which is rare in *B. p. fjeldsai*, especially in its southernmost range. Males with apparently uniform plumage and little barring on the thighs and rear underparts are lead grey to steel grey, whereas in *B. p. poecilochrous* they are paler ash-coloured. Pale birds have obvious dark transverse lines on the white chest, belly and thighs; pale *B. p. poecilochrous* has fewer marking on the underparts,

and some are pure white below. First- and second-years have brown upperparts with ginger-red or rusty-red markings, whereas younger *B. p. poecilochrous* are darker brown with creamy or ochre markings.

*Description of the holotype.*—Narrow line on forehead and pre-ocular region white with black filiform feathers; upperparts including head- and neck-sides slate-grey with black striations on feather shafts, and vague ash-coloured fringes. Nape feathers white basally, with small black spots at tips contrasting visibly; mantle uniform, with some feathers slightly tinged at bases with reddish; scapulars slate-grey with paler centres and darker edges, some finely edged brown-ochre; lower scapulars slate-grey with wavy blackish barring and brown fringes, some faintly tinged reddish. Lesser wing-coverts uniform and blacker; median and greater coverts paler with brown sheen and dark barring; primaries and secondaries slate-grey with brown tinge, dark barring and paler tips; inner primaries and secondaries edged white at tips. Back dark slate-grey with lead grey markings; upper rump grey with white-edged feathers, lower rump with wide-spaced, fine grey barring; uppertail-coverts white with sparse, wavy black-brown lines; tail white with eight irregular wavy black transverse bars, broad subterminal black band (c.20 mm) with proximal narrow pale grey band and, distally, white edging. Chin and throat white, with black filiform feathers on former and striations on latter comprising dark shafts and narrow black markings on sides that become larger and denser on upper neck; obvious blackish slate-grey chest-band, darker than back, with some feathers variably fringed or tipped white-grey mixed with some white feathers; mid and lower underparts, flanks, belly and thighs white, with well-spaced black barring becoming finer and browner rearwards; white undertail-coverts. Underwing-coverts and axillaries white with black barring. Inner margin of primaries dirty white at base, with barring and brown-grey markings becoming black-brown towards tip; some have white tips, whilst others may lose these through abrasion. Soft parts: brown irides; bluish-grey bill with blackish tip; yellow cere; yellow legs with black claws.

*Description of the paratypes.*—Dark-morph males have two different definitive plumages. The first is dark grey to slate-grey with white throat and dark barring; underparts white with dark barring, as holotype. Examples include EBD 7476A, which is darker than holotype, without white on forehead, generally less white on underparts, and bolder barring. Throat more heavily streaked; foreneck and neck-sides to lower breast dark slate-grey, some feathers on lower chest have whitish edges; rest of plumage as holotype, but has bolder markings and coarser dark barring; tail has ten, bolder transverse bars and broader subterminal black band (45 mm). EBD 4866A: like previous birds, but dark plumage black-brown rather than dark slate-grey, with narrower tail-band (35 mm). BMNH 1899.10.3.3 and MNHN 3024 have same pattern, with paler dark parts (dull steel grey, not blackish or brownish slate-grey). Birds of the second type appear uniform lead grey, paler than those described above, with thin, sparse barring restricted essentially to the sides and rear underparts. Examples include BMNH 1902.3.13.1601 and EBD 6917A, which are uniform grey, with few white marks limited to fine white barring on lower chest, thighs and belly; lesser and median underwing-coverts uniform grey or with slight white barring, unlike greater coverts, which are densely barred white and grey; upperside (wing and tail) like holotype.

Dark-morph females are similar to holotype, but have brick-red dorsal patch and are somewhat more boldly barred than males. Examples include EBD 6925, with cheeks and ear-coverts finely streaked grey and white; brick-red mantle with dark streaks on shafts;

some partially grey feathers on sides of mantle and lower dorsal patch. Upper and middle scapulars partially reddish; lesser coverts with whitish edges; median and greater wing-coverts, secondaries and inner primaries grey, whilst outer primaries have bluish-silvery bases, all with contrasting black barring; tail dirty white, outer feathers with greyish margins at tips, and 11 irregular blackish bars. White throat heavily streaked black; grey chest-band with broad whitish-edged feathers; rest of underparts more boldly barred, especially flanks. BMNH 1892.2.10.438 is more white below; chin dark-streaked and central chest grey with white feathers; belly has white and grey barring, with some retained reddish-brown feathers on rear underparts and wing-coverts from previous plumages; extensive reddish dorsal patch on mantle and scapulars. BMNH 1904.7.9.3 has more extensive dorsal patch, from hindneck to scapulars; underparts with more grey and less white; throat with more dark streaking, bib more uniform grey with white-edged feathers and a few white feathers at sides; rest of underparts, flanks and thighs more boldly barred black than previous bird. MNHN 3025 has recently acquired definitive plumage similar to previous birds, but much more reddish with extensive dorsal patch reaching tertials; reddish feathers in wing-coverts and on central underparts retained from previous plumage.

Pale-morph males have steel grey back with pale ash-coloured sheen; underparts (including cheeks) pure white or with fine variable barring over chest, flanks, thighs and underwing-coverts; tail has irregular transverse bars above tail-band that are finer than in previous plumages. BMNH 1902.3.13.1598 has fine dark barring on chest, flanks and thighs. EBD 5700 similar but has vague wavy transverse bars over chest, belly and thighs. EBD 6917 has white middle chest, belly, flanks, uppertail-coverts and median and lesser underwing-coverts, all with fine dark barring.

Pale-morph females have upperparts similar to dark-morph females, whilst the underparts recall those of pale-morph males, with a few partly red feathers in the rump (BMNH 1873.7.4.5) or median and lesser wing-coverts (BMNH 1887.5.1.333), or in both (BMNH 1899.10.3.2).

*Geographical variation.*—Birds from Peru are paler and more steel grey, whereas those from Bolivia, Argentina and Chile are darker and more slate-grey. Dark specimens from the south are white below, with streaking on the throat, a broad chest-band and blackish-barred rear underparts, which overall afford a very contrasting pattern.

*Age variation.*—Old birds in definitive plumage have purer grey and black tones, with lesser wing-coverts white-edged and with white scaling on the wing edge (pers. obs. in captive birds). In contrast, birds in recently acquired definitive plumage have a brownish cast to the grey parts. In both morphs larger areas of purer white appear with age and there is a gradual loss of darker areas of plumage. In the oldest dark-morph birds, the white throat and the underparts barring restrict the dark chest-band, in which the number of white feathers increases. The underparts of old females possess the same pattern as in males of the same morph, whilst the reddish dorsal patch contracts and is limited to the mantle. In addition, both the reddish tones on the underparts (only in the dark morph) and the reddish feathers in the upperwing-coverts and rump (both morphs), which are typical of females in pre-definitive or recently acquired definitive plumage, disappear.

*Morph variation.*—Dark-morph males have darker upperparts than pale morphs. Nevertheless, females of both morphs possess similar dorsal coloration. Dark-morph males possess two definitive body patterns: a) dark (slate-grey or blackish), with a white throat, dark grey chest and white underparts with black barring, which may vary individually in



extent and intensity (Fig. 4); b) uniform steel or lead-grey, less black with smaller areas of white plumage; they lack contrast on the throat and have faint white barring only on the belly and thighs. Dark females have the underparts as the holotype (Fig. 5). No females with uniform grey underparts (as in dark males) have been observed. Pale-morph individuals (both sexes) show little variation in the intensity and depth of the wavy barring on the underparts and underwing-coverts (Figs. 6–7).

*Measurements.*—*B. p. fjeldsai* is slightly smaller than *B. p. poecilochrous* (Table 1), except that the alula and outermost primary are longer, and the primary tips narrower.

TABLE 1  
Mean and typical deviations of body measurements (in mm) for *B. p. poecilochrous* and *B. p. fjeldsai*  
(\* =  $p < 0.001$ , ANOVA).

	<i>B. p. poecilochrous</i> ♂			<i>B. p. fjeldsai</i> ♂			<i>B. p. poecilochrous</i> ♀			<i>B. p. fjeldsai</i> ♀		
	<i>n</i>	<i>x</i>	s.d.	<i>n</i>	<i>x</i>	s.d.	<i>n</i>	<i>x</i>	s.d.	<i>n</i>	<i>x</i>	s.d.
Weight (g)	0	-	-	8	840	76.7	1	1,300	0	13	1,170	69.5
Culmen*	13	36.8	1.1	15	34.6	1.6	15	40.1	1.2	14	38.4	1.3
Cranial width	7	49.8	2.3	8	48.3	1.3	6	50.7	2.1	10	49.7	1.4
Tarsus*	12	96.1	3.7	17	91.8	3.5	14	100.1	5.1	19	96.0	4.4
Toe 2*	12	35.1	2.4	13	33.1	1.4	11	38.8	2.8	13	36.1	1.3
Toe 4*	11	24.9	1.5	13	23.4	1.4	11	27.4	2.8	14	25.2	1.3
Outer claw*	11	24.9	1.1	13	24.6	1.3	12	27.9	1.4	13	27.7	1.2
Inner claw*	11	26.0	1.1	12	24.5	1.3	12	29.2	1.2	14	28.0	1.5
Cubito-radius	16	146.7	4.9	13	135.0	3.6	6	151.4	2.5	16	146.7	5.0
Wing*	20	434.3	10.2	17	423.7	10.1	15	469.1	10.3	19	464.3	8.6
Alula*	12	116.7	6.9	12	118.4	5.6	13	124.0	7.9	17	126.3	5.1
P10 length*	11	198.9	11.1	13	208.0	11.5	13	215.5	7	16	220.4	6.4
Tail *	12	220.9	19.3	14	216.6	13.6	15	241.4	18	17	233.8	14.3
Outer secondary*	18	236.1	22.0	13	234.4	11.0	14	256.3	14.6	18	253.0	12.4
P10 width*	11	23.1	0.8	11	21.3	1.4	12	25.3	1.4	14	23.5	1.34
P9 width*	12	25.1	1.1	10	24.1	0.6	12	27.7	1.2	14	26.0	1.57
P8 width*	11	27.1	1.8	10	25.7	1.3	11	30.2	1.1	13	28.7	1.7

*Distribution.*—Northern Peru to north-west Argentina and Chile, where apparently sedentary (Cabot 1988, 1991).

*Habitat.*—High ridges and *puna* in the Andes, at 3,000–5,000 m to the snowline (Fjeldsá 1987, Cabot 1988, 1991). At the southern limit of its range in Calama (Antofagasta), in the Atacama of northern Chile, *B. poecilochrous* has been reported at *c.*2,000 m, an unusually low altitude (Cabot *et al.* submitted), where it hunts over the green belts and cultivation bordering the río Loa.

*Breeding.*—On escarpments and cliffs, although a pair in dpto. Puno, Peru, bred on a *Puya raimondii* tree, initiating the clutch in April–May (Macedo 1964). In Calama, Chile, three pairs (L. Demetrio pers. comm.) started breeding in September, in the early spring (Demetrio & Torres-Mura 1991). In the same area, Cabot *et al.* (submitted) observed a fledged juvenile as well as recently occupied nests on cliffs beside the río Loa in November. As in *B. p. poecilochrous* (Solís & Black 1985, Coello 1997), the newly described subspecies breeds in solitary pairs (Macedo 1964), but sometimes with more than one male in a given territory (Cabot *et al.* submitted).

**Etymology.**—The subspecific epithet honours Jon Fjeldså, for his contribution to the conservation of Andean ecosystems and his many contributions to ornithology, and is formulated as a noun in the genitive case, following the relevant Articles of the Code (ICZN 1999; Arts. 32.5.2.1 and Art. 31.1.2).

#### Acknowledgements

We are very grateful to David A. Christie who revised the text and provided many important suggestions that substantially improved the manuscript. The help of Dr Robert Prŷs-Jones (The Natural History Museum, Tring) was essential. We also thank the staff of the following museums for access to specimens: Museo de la Universidad del Cauca, Popayán; Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá; Museo Ecuatoriano de Ciencias Naturales, Quito; Museo de Ciencias Naturales del Instituto 'Mejía', Quito; Museo de la Escuela Politécnica Nacional, Quito; Museo Nacional de Ciencias del Instituto Técnico Superior 'Bolívar', Ambato; Universidad Nacional, Quito; The Natural History Museum, Tring; Institut Royal des Sciences Naturelles de Belgique, Brussels; Zoological Museum, University of Amsterdam; Muséum National d'Histoire Naturelle, Paris; Museum d'Histoire Naturelle Ville de Geneve, Geneva; Estación Biológica de Doñana, Seville; Museo Nacional de Ciencias Naturales, Madrid; Naturhistoriska Riksmuseet, Stockholm; Zoological Museum, Copenhagen; and Naturalis, Leiden. We also thank Dr Lilian Vilallalba at the Museo de Historia Natural de La Paz, Dr Sylke Frahnert of the Museum für Naturkunde, Berlin, and Dr Terry Chesser at the US National Museum of Natural History, Washington DC, for providing photographs of specimens. L. & M. Newman of Berkhamstead provided hospitality during JC's visit to England, and Antonio Jiménez Lara also proffered photographs. Lorenzo Demetrio Jara also provided useful information and specimen photos. Two MAE grants partly covered the costs of JC.

#### References:

- Buitrón-Jurado, G., Cabot, J. & de Vries, T. in press. Patrón de distribución preliminar del Busardo dorsirrojo (*Buteo polyosoma*) en Ecuador. *Act. I Congr. Intern. Aves Rapaces y Conserv., Quito 1–5 de abril 2008*. SIMBIOE-PUCE.
- Cabot, J. 1988. Dinámica anual de la avifauna en cinco habitats del Altiplano norte de Bolivia. Ph.D. thesis. Univ. Córdoba, Spain.
- Cabot, J. 1991. Distribution and habitat selection of *Buteo polyosoma* and *B. poecilochrous* in Bolivia and neighbouring countries. *Bull. Brit. Orn. Cl.* 114: 199–209.
- Cabot, J. & de Vries, T. 2003. *Buteo polyosoma* and *B. poecilochrous* are two distinct species. *Bull. Brit. Orn. Cl.* 123: 190–207.
- Cabot, J. & de Vries, T. 2004. Age- and sex-differentiated plumages in the two morphs of the Variable Buzzard *Buteo polyosoma*: a case of delayed maturation with subadult males disguised in definitive adult female plumage. *Bull. Brit. Orn. Cl.* 124: 272–285.
- Cabot, J. & de Vries, T. 2005. On the type locality of the Cordilleran Buzzard *Buteo poecilochrous*. *Bull. Brit. Orn. Cl.* 125: 147–148.
- Cabot, J. & de Vries, T. 2008. Relaciones taxonómicas y plumajes de los busardos dorsirrojos *Buteo polyosoma* y *B. poecilochrous*. *Act. Mem. I Reunión Orn. Quito, Ecuador: 2–7*. Univ. San Francisco de Quito, 3–5 de marzo 2005.
- Cabot, J. & de Vries, T. in press. On the common name of *Buteo poecilochrous* as used in ornithological literature. *Act. I Congr. Intern. Aves Rapaces y Conserv., Quito 1–5 de abril 2008*. SIMBIOE-PUCE.
- Cabot, J., Alvarado, S. & de Vries, T. submitted. First breeding record and new data on distribution and altitude for Gurney's Buzzard *Buteo poecilochrous* in Chile. *Bull. Brit. Orn. Cl.*
- Coello, M. 1997. Biología reproductiva y hábitos alimenticios de *Buteo poecilochrous* en el páramo de la Reserva Ecológica Antisana, Ecuador. Thesis. Pontificia Univ. Católica del Ecuador, Quito.
- Demetrio, L. & Torres-Mura, J. C. 1991. La dieta de aguiluchos (*Buteo polyosoma* y *Buteo* sp.) en un ambiente de desierto. *Resum. I Congr. Chil. Orn., III Encuentro Nac. Orn. Valdivia*.
- Ellegren, H. 1996. First gene on the avian W chromosome (CHD) provides a tag for universal sexing of non-ratite birds. *Proc. Roy. Soc. Lond. B* 263: 1635–1641.
- Farquhar, C. C. 1998. *Buteo polyosoma* and *B. poecilochrous*, the "Red-backed Buzzards" of South America are conspecific. *Condor* 100: 27–43.
- Fjeldså, J. 1987. *Birds of relict forests in the high Andes of Perú and Bolivia*. Tech. rep. Zool. Mus., Univ. of Copenhagen.
- Fjeldså, J. & Krabbe, N. 1990. *The birds of the high Andes*. Zool. Mus., Univ. of Copenhagen & Apollo Books, Svendborg.
- Gurney, J. H. 1879. Note upon three American raptorial birds apparently new to science. *Ibis* (4)3: 171–178.
- Hull, J. M., Wesley, S. K., Bollmer, J. L., Kimball, R. T., Parker, P. G., Whiteman, N. K. & Holly, B. E. 2008. On the origin of the Galápagos hawk: an examination of phenotypic differentiation and mitochondrial paraphyly. *Biol. J. Linn. Soc.* 95: 779–789.

- International Commission for Zoological Nomenclature (ICZN). 1999. *International code of zoological nomenclature*. Fourth edn. International Trust for Zoological Nomenclature, c/o The Natural History Museum, London.
- Jaksić, F. M., Silva S., Márquez, P. & Contreras, L. C. 1991. Food habits of Gurney's Buzzard in pre-Andean ranges and the high Andean plateau of northernmost Chile. *J. Raptor Res.* 25: 116–119.
- Jiménez, J. E. 1995. Historia natural del Aguilucho *Buteo polyosoma*: una revisión. *Hornero* 14: 1–9.
- Jiménez, J. E. & Jaksić, F. M. 1990. Diet of Gurney's Buzzard in the puna of northernmost Chile. *Wilson Bull.* 102: 344–346.
- Lerner, H. R. L., Klaver, M. C. & Mindell, D. P. 2008. Molecular phylogenetics of the Buteonine birds of prey (Accipitridae). *Auk* 125: 304–315.
- Macedo, H. 1964. Curieux cas de nidification du *Buteo poecilochrous* Gurney sur *Puya raimondii*. *Oiseau & R.F.O.* 34: 200–203.
- Mayr, E. 1963. *Animal species and evolution*. Harvard Univ. Press, Cambridge, MA.
- Pávez, E. F. 1998. Observaciones sobre el patrón de coloración en machos y hembras de Aguilucho (*Buteo polyosoma*, Quoy y Gaimard, 1924). *Bol. Chil. Orn.* 5: 21–23.
- Paynter, R. A. 1988. *Ornithological gazetteer of Chile*. Mus. Comp. Zool., Harvard Univ., Cambridge, MA.
- Sclater, P. L. & Salvin, O. 1880. On new birds collected by Mr. C. Buckley in eastern Ecuador. *Proc. Zool. Soc. Lond.* 1880: 155–161.
- Solís, C. & Black, J. 1985. Anidación de *Buteo poecilochrous* en Antisana. *Rev. Geogr., Quito* 21: 132–142.
- Stephens, L. & Traylor, M. A. 1983 *Ornithological gazetteer of Peru*. Mus. Comp. Zool., Harvard Univ., Cambridge, MA.
- de Vries, T. 1973. The Galapagos Hawk. An eco-geographical study with specific reference to its systematic position. Ph.D. thesis. Free Univ. of Amsterdam.
- Addresses:* J. Cabot, Estación Biológica de Doñana (CSIC), Av. Maria Luisa s/n. 41013, Seville, Spain, e-mail: cabot@ebd.csic.es. T. de Vries, Dpto. Biología, Pontificia Universidad Católica del Ecuador, Apartado 17-01-2184, Quito, Ecuador, e-mail: tdevries@puce.edu.ec